

In the Specification:

Please delete the heading at page 1, above line 1.

Please add a new heading at page 1, above line 1, as follows:

TITLE OF THE INVENTION

Please add a new heading at page 1, above line 2, as follows:

FIELD OF THE INVENTION

Please replace the paragraph at page 1, lines 2 to 7, with a replacement paragraph amended as follows:

The invention relates to an apparatus for the determination of loads on fiber composite components ~~according to the preamble of the patent claim 1~~ as well as production methods thereof ~~according to the preamble of the patent claim 9~~ and a pick-up or sensor element for the apparatus, ~~according to the preamble of the patent claim 11~~.

Please add a new heading at page 1, above line 8, as follows:

BACKGROUND INFORMATION

Please add a new paragraph at page 6, following line 12, as follows:

Strain gages and methods for their production are, however, previously known from the EP 0 667 514 B1. These basically consist of a typical commercially available

photolithographically produced measuring grid that is vapor deposited on a carrier film and additionally is covered with a protective layer. For the connection, this measuring grid has flat soldering connection surfaces, which represent the beginning and the end of the measuring grid. Connection wires are soldered thereon for the wiring, and are lead to the provided connection parts for the circuit-connection. Such a strain gage can basically be applied only on the surface of a strain body, because otherwise a subsequent wiring-connection is no longer possible. A previous wiring-connection would also be unrealistic, because an economical handling of a plurality of connection wires is hardly possible in the known production methods of composite materials.

Please add a new heading at page 6, above line 13, as follows:

SUMMARY OF THE INVENTION

Please replace the paragraph at page 6, lines 19 to 22, with a replacement paragraph amended as follows:

This object is achieved by the invention set forth herein.
~~in patent claim 1, 11 and 13. Further developments and
advantageous example embodiments of the invention are set
forth in the dependent claims.~~

Please delete the paragraph at page 6, line 23 to page 7,
line 12.

Please add a new heading at page 9, above line 1, as follows:

BRIEF DESCRIPTION OF THE DRAWINGS

Please add a new heading at page 9, above line 19, as follows:

DETAILED DESCRIPTION OF EXAMPLE EMBODIMENTS OF THE INVENTION

Please replace the paragraph at page 14, lines 3 to 18, with a replacement paragraph amended as follows:

In Fig. 3 of the drawing, the special strain gage 3 consisting of a measuring grid 5 and two carrier layers or substrates 6 and 7 is illustrated in a side view, whereby especially the embodiment or construction of the contact pins 8 is depicted enlarged in a side illustration. From that it can be seen that the contact pins 8 during their production are provided with an insulating protective layer 20, in order to prevent a current flow that falsifies the measurement value, in connection with electrically conducting composite layer materials 1 such as, for example, carbon fibers. This insulating layer 20 is preferably of a polymeric temperature resistant material. In a particular embodiment of the invention, the embodiment forms of the strain gages 3 as pick-up or sensor elements can also be produced as rosettes. Moreover, this embodiment of the strain gages 3 can also be used for other sensor elements, which are integratable in fiber composite materials 1, such as piezo fiber modules.

Please replace the paragraph at page 14, line 19 to page 15, line 19, with a replacement paragraph amended as follows:

For contacting with a connecting post or pad 11, this insulating layer is removed or scraped off by provided clamp or terminal edges of the connecting post or pad 11 during the plugging-on process, in order to lead it to the electronic evaluating apparatus 4 via a cable connection 12 that is to be produced subsequently. In the evaluating apparatus 4, the individual strain gages 3 are first circuit-connected to a Wheatstone bridge, in order to be able to evaluate the detected strains. Similarly, also the remaining strain gages, which are not shown, in the other fiber composite material areas are lead to the electronic evaluating [[4]] or monitoring apparatus 4. Thereby, in connection with the monitoring in an aircraft, even up to a few hundred of such sensor elements 3 can be circuit-connected to the evaluating or monitoring apparatus 4, by which, during the flight operation, both the load magnitudes as well as the exceeding of prescribed load limits is displayable or signalable in a location allocated manner. Such apparatuses can, however, also be utilized for tension analyses in connection with prescribed load progressions. In large surface area aircraft components it is partially necessary in connection with the tension analysis, to provide several thousand of such strain gages 3 as sensor elements in the components that are to be tested, in order to be able to evaluate an exact loading

behavior. For that purpose, especially a subsequent solder-free contacting possibility via connecting posts or pads 11 that are able to be plugged-on and an integration into the composite material parts 1 in the fabrication facility [[is]] are advantageous.

Please replace the paragraph at page 17, lines 1 to 23, with a replacement paragraph amended as follows:

Fig. 6 shows a further preferred example embodiment of the invention with several integrated strain gages 3. Three strain gages 3 with measuring grids 5 are integrated at various different locations of the structure of fiber composite material 1 in various different layers. The Figure 6 shows the cross-section through the structure, which consists of a cover skin and an inwardly arranged stiffening rib. For the identification of the measuring locations, the contact pins 8 are used to secure an electrical unit 28 on the inner side of the structure, with the help of which electrical unit 28 the evaluating apparatus 4 can identify the measurement locations. The evaluating apparatus 4 ~~consists of~~ includes a shielded housing 24 and a current source 25. The measurement signals are amplified [[26]] with an electrical module or amplifier unit 26 and delivered to a data processor [[22,]] 29, which processes the current measured value and stores it in the memory unit 27. Additionally, the evaluating apparatus 4 is equipped with an internal timer 23, so that

the magnitude and the prevalence of strain conditions in the structure can be recorded. Additionally, the current measured value can be compared with reference signals and thereby the exceeding of limit values can be recognized. The stored data can be read-out for example during the service, and the data can be evaluated for the proof of the remaining service life of the structure.

[RESPONSE CONTINUES ON NEXT PAGE]